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Teaching Reading in the High School

in

Language Arts
Social Studies
Science
Mathematics
Industrial Arts

CLOY ST. CLAIRE HOBSON

THE UNIVERSITY
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Table of Contents

	PAGE
PART I: INTRODUCTION	1
PART II: READING SKILLS AND METHODS OF TEACHING THEM	3
Reading Skills and Habits Needed in the Language Arts	3
Illustrative Methods and Devices a High School Language Arts Teacher May Use to Improve Reading of Materials in His Classes	5
Reading Skills and Habits Needed in the Social Studies	10
Illustrative Methods and Devices a High School Social Studies Teacher May Use to Improve Reading of Materials in His Classes	11
Reading Skills and Habits Needed in Science	16
Illustrative Methods and Devices a High School Science Teacher May Use to Improve Reading of Materials in His Classes	18
Reading Skills and Habits Needed in Mathematics	23
Illustrative Methods and Devices a High School Mathematics Teacher May Use to Improve Reading of Materials in His Classes	24
Reading Skills and Habits Needed in the Industrial Arts	29
Illustrative Methods and Devices a High School Industrial Arts Teacher May Use to Improve Reading of Materials in His Classes	30
PART III: RESEARCH IN READING AT THE UNIVERSITY OF KANSAS	33
Studies of Readability	33
Studies of Retarded Readers	36
Studies of Reading Improvement	40
Studies of Reading Factors	43
Bibliographical Studies of Reading Materials	45

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Teaching Reading in the High School

PART I

Introduction

Cloy S. Hobson
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Educators have long recognized that instruction in reading should be provided for pupils in the secondary school. Studies have revealed a wide range of reading ability among secondary pupils, with many of these pupils well below the level of competence necessary for reading the text and reference material of their grade. The findings of three of such studies are typical.

Kottmeyer[1] discovered that 7,380 eighth-grade graduates ranged in reading ability from above college-freshman level to below fourth-grade level. Center and Persons[2] report that over 50 per cent of the 7,174 pupils tested in the Theodore Roosevelt High School in New York City were below the accepted norm for the grade in reading and that 38 per cent of the graduating class were below the expected level. Penty[3] reports that of the 2,384 pupils entering the tenth grade in Battle Creek, Michigan, from 1947 to 1951, the lower quarter of the class ranged in reading ability from grade 4.3 to grade 6.9, and the upper quarter ranged from grade 9.0 to grade 13.0.

What responsibility does this wide range of reading ability among high-school pupils place on their teachers? Witty answers this question by stating: "All high-school teachers face the responsibility of adapting assignments to, of utilizing to a maximum, and of further developing the reading abilities of students who differ as much as six or eight grades in reading competence."[4]

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[1] William Kottmeyer. "Improving Reading Instruction in the St. Louis Schools." *Elementary School Journal,* 45 (September, 1944) 33-38.

[2] Stella S. Center and Gladys L. Persons. *Teaching High-School Students to Read.* D. Appleton-Century Company, New York, 1937. pp. 9-14.

[3] Ruth C. Penty. *Reading Ability and High-School Drop-Outs.* Bureau of Publications, Teachers College, Columbia University, New York, 1956. p. 19.

[4] Paul A. Witty. *Reading in High School and College.* Forty-Seventh Year Book, Part II, National Society for the Study of Education. University of Chicago Press, Chicago, 1938. pp.18-19.

Simpson assures high-school teachers that:

> No matter how poorly or how well high-school students read, every high-school teacher can help them to read with better understanding the text book and other materials that are required in his course. No matter whether previous teachers did a poor or a good job of training students to read, this teacher can aid his students to develop reading skills, habits, and attitudes that are necessary not only to pass his course but also to achieve more in it.[5]

The Kansas Association for Supervision and Curriculum Development, recognizing this need for reading instruction in the secondary school, appointed a committee[6] to consider what can be done to help teachers in Kansas discharge better their responsibility for teaching reading in the high schools and to make a report to the Association of the findings.

The committee defined five types of reading instruction that should be carried on in the secondary school and indicated the teachers responsible for each type.

1. An extension of the developmental reading program which was begun in the elementary school is the responsibility chiefly of the English teachers.
2. Instruction in the reading skills peculiar to each subject-matter field is the responsibility of the teachers of each subject-matter field, including, of course, English.
3. Rapid progress reading instruction for pupils who, because of some misfortune or irresponsibility in the past, are not reading up to their capacity can best be carried on by specialized reading teachers.
4. Developmental reading for severely retarded or disabled readers, which may or may not involve remediation in reading as much as the removal of handicaps or blocks to the learning of reading, can best be carried on by specialized reading teachers.
5. Improvement in reading for academically talented pupils, who, although they are already reading well above their grade level, can read still better, can probably be directed by any interested and capable teacher or by a specialized reading teacher.

The committee decided that its first efforts should be directed toward the problems involved in type 2. Specifically, the committee set out to provide the help a teacher in a subject-matter field in the high school needs to teach

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[5] Elizabeth A. Simpson. *Helping High-School Students to Read Better.* Science Research Associates, Chicago, 1954. p. 3.

[6] Harvey Littrell, Chairman, Kansas State University
Hazel Kier, Kansas City, Kansas, Public Schools
Alex Christ, Leavenworth Public Schools
Gwendel Nelson, Wichita Public Schools
Cloy Hobson, The University of Kansas

effectively the reading skills peculiar to his field. The subject fields selected were English, mathematics, social studies, science, and industrial arts. Each committee member was given responsibility for one of the five fields.

Two questions immediately were posed: What are the reading skills which are peculiar to each field and which the teacher needs to teach? What methods and devices have teachers in Kansas used to teach these skills? A tentative list of answers to each of these questions was prepared by each member of the committee for the field of his responsibility. These lists were submitted to approximately twenty master teachers in each of the five fields with the request that they correct and amplify the tentative lists. Compilations were then made by each member of the committee of the returns contributed. The corrected lists were then offered to those teachers in each field, at the KSTA regional association meetings, who would volunteer to attempt further corrections and additions. The two lists presented here, therefore, represent the combined contributions of a large number of Kansas teachers. They are submitted as suggestions as to what high-school teachers in the five fields should do and can do to improve the reading, and hence the achievement, in their respective fields.

Following the listing of the skills and methods for teaching them is a summary of 18 research studies, completed at the University of Kansas, that directly relate to the teaching of reading in grades 7 to 12.

PART II

Reading Skills and Methods of Teaching Them*

Reading Skills and Habits Needed in the Language Arts

I. A good reader in a language arts class should be able to:

A. Utilize sources to locate materials.

1. Indexes.
2. Tables of contents.
3. Glossaries.
4. Card catalogues.
5. *Reader's Guide to Periodical Literature.*
6. General references.
7. Newspapers, magazines, pamphlets.
8. Tables, maps, graphs, charts.
9. Dictionaries and word guides.

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* Committee members responsible for collecting the information in each field were as follows: Harvey Littrell, Mathematics; Hazel Kier, Language Arts; Alex Christ, Social Studies; Gwendel Nelson, Industrial Arts; and Cloy Hobson, Science. The compiling, arranging, and editing of Part II was done by Professors Cloy S. Hobson and Oscar M. Haugh.

B. Adjust reading speed to the type and difficulty of the materials and to the reading purpose.
   1. Gaining a general appraisal of the material.
   2. Skimming the contents of the material.
   3. Reading for memorization of general concepts and/or details.
   4. Reading carefully and critically.

C. Comprehend written material.
   1. Understanding word meanings.
   2. Determining general significance of the context of sentences, paragraphs, chapters, books, lines of poetry, scenes and acts from plays, and complete dramas.
   3. Recognizing important details:
      a. Isolated facts.
      b. Evidence to buttress main ideas.
      c. Answers to specific questions.
   4. Noting and understanding use of transitional words, phrases, and clauses as bridges to join ideas.
   5. Realizing the author's purpose in writing.

D. Evaluate the material intelligently.
   1. Determining the competency of the author and reliability and relevancy of the content.
   2. Comparing new concepts gained in reading with previously held concepts.
   3. Analyzing the significance of the date of publication.
   4. Adopting the mood which the author wants to create.
   5. Judging the validity of character portrayal.

E. Apply concepts gained from the reading material to confronting situations.
   1. Solving problems.
   2. Taking part in a discussion.
   3. Doing additional reading to get more adequate information.
   4. Observing and analyzing life situations and comparing them to material read.
   5. Stimulating imagination and thought.

F. Present written material orally.

G. Understand the importance of reading and ways to satisfy intellectual curiosity through reading.

H. Make accurate self-evaluations of progress in reading in the language arts.
   1. Realizing the importance of self-evaluation.
   2. Using a self-evaluation check list periodically.

Illustrative Methods and Devices A High School Language Arts Teacher May Use to Improve Reading of Materials in His Classes*

I. Methods that might be used in teaching language arts pupils:

A. To utilize sources to locate materials such as:

1. Indexes, tables of contents, glossaries, the card catalogue, and the *Reader's Guide to Periodical Literature*
   a. Discuss where to find each of these sources and the material that each contains.
   b. Conduct "treasure hunts" for information requiring the use of these sources.
   c. Assign each student a different item to report on.
2. General references, newspapers, magazines, and pamphlets
   a. Discuss the general references, newspapers, magazines, and pamphlets that are most likely to be used, where they can be found, and the information that they contain.
   b. Assign speaking and writing problems requiring the use of these sources.

B. To vary reading speed:

1. Set up time limit appraisals to determine the value of a quick look at table of contents, titles, subtitles, and pictures to gain an overall idea of the contents.
2. Set up time limit tests to see how much general content and/or details can be learned from looking at each paragraph quickly and noting italics, dates, and figures.
3. Compare the time necessary to read a section of a seventh grade book with the time necessary to read a section of the same length in a book written for high school juniors.
4. Compare the time necessary to read a section of a book when the reader wants to generalize with the time necessary to read the same section when he wants to find specific details.
5. List purposes for which pupils might read and determine the possible speed of reading for each purpose.

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* The illustrative methods and devices suggested follow the same plan of organization used for listing reading skills and habits in each of the five fields. For example, the methods and devices listed for the Language Arts under A illustrate the reading skill or habit listed under A in the preceding section. The same organizational pattern is used for B and all succeeding sections.

6. Compare the time necessary to read sections of the same length in different types of literature: essay, novel, poetry, play news story, problems in mathematics, a law report or directions on a commercial product or a game.
7. Determine speed of reading and repetitions necessary for memorization of general concepts and of details by trial and tests with parallel paragraphs.
8. Compare reflective reading with story reading of the same novel by different persons when both are reading for pleasure.

C. To comprehend written material in such skills as:

1. Understanding word meanings
   a. Use the dictionary for specific word study.
   b. Discuss etymology.
   c. Explain "New Word" sections of the dictionary.
   d. Give opportunities to use new words in oral and written reports.
   e. Discuss the meaning of new words that will be appearing in reading assignments.
   f. Show pupils how to keep a notebook of new words.
   g. Discuss usage of slang, euphemisms, metaphors, "colored" words, and figures of speech.
   h. Show pupils how to keep a personal dictionary of new words.
   i. Make word lists or drill cards for individual and class use.
   j. Develop crossword puzzles for individual and small group use.
   k. Give opportunities for "guessing" the meaning of words used in context.
   l. Provide visual experiences for vocabulary building through field trips, film strips and motion pictures.
   m. Teach pupils how to get word meanings from context aided by a knowledge of grammar.
   n. Teach roots, prefixes, suffixes and how they may be used in a variety of combinations.
   o. Place a new word in a conspicuous place on the board each day.
   p. Explain and assign pupil exercises to teach the different ways in which an individual word may be used as different parts of speech and with different meanings.

2. Determining general significance of the context through assigned pupil activities such as:
   a. Restate sentences and lines of poetry using the pupil's own words.
   b. Find basal parts of difficult sentences in poetry and rearrange in normal word order to discover meaning.

c. Read poetry and difficult material aloud to get meaning through proper observance of punctuation.
d. Write newspaper headlines that summarize paragraph content.
e. Discuss the relationship of the content of one paragraph to that of another paragraph.
f. Discuss the relationship of the content of one paragraph to that of an entire section or chapter.
g. Outline a chapter after hearing a one-sentence summary of each paragraph in sequence.
h. Write a summary of information gathered from various sources.
i. Write a good sentence with modifiers and understand that the subject, verb, and complement express the main ideas and that the modifiers supply the details; expand the sentence into a paragraph or theme using the main ideas and details.
j. Practice precis writing.
k. Summarize a chapter of a book or act of a play.
l. Outline a chapter of a book or act of a play.
m. Discuss the relationship of one chapter or act to that of another chapter or act.
n. Discuss the relationship of one chapter or act to the entire book or play.
o. Select one character and describe his action and reasons for action from the beginning to the end of the story or play.
p. Prepare oral and written reports of a single book or play.
q. Prepare oral and written reports comparing two or more books or plays.
r. Suggest other titles for books and plays.
s. Illustrate books or plays with appropriate cut lines from context.

3. Recognizing important details
   a. Give specific questions on some types of literature that pupils can answer as they read.
   b. Give specific questions that pupils can answer after reading.
   c. Have the pupils determine the topic sentence of a paragraph and then find evidence to support the idea expressed.
   d. Secure class agreement on the main idea of a paragraph or a whole selection and have pupils find evidence to support this idea.
   e. Have pupils jot down important details as they read and then rank them in importance according to criteria agreed upon by the class.
   f. Ask pupils to compose questions about details of the selection that they consider important.

g. Assign pupils to write topic sentences with supporting details and then construct paragraphs.

D. To evaluate reading materials:
1. Develop with the class criteria such as author's background, position, experience with the subject, prejudices, style of writing, and date of publication for determining competency of the author.
2. Develop an idea and have pupils find relevant and irrelevant information and valid and invalid information concerning the idea.
3. List authorities in specific areas and discuss whether their writing should be accepted or not. Determine why or why not.
4. Find differing views on a subject and discuss which are most valid and why.
5. Compare the style of writing of various authors and determine strengths and weaknesses.
6. Hold panel discussions with students presenting various views on the validity of various opinions.

E. To apply concepts gained from reading materials:
1. Use problems in which the pupils must follow exacting written directions.
2. Teach pupils to predict how various authors would solve certain problems.
3. Have pupils observe the behavior of fellow pupils and determine how reading might have influenced this behavior.
4. Assign pupils to rewrite what has been read in a different form such as a play as an essay, a book as a play, or an article in the style of different authors.
5. Teach how cartoons or pictures may be used to show comprehension of material read.
6. Have pupils rewrite endings of selections and explain reasons for changes.
7. Assign the pupils to write a theme on "Reading Problems" or "What is Effective Reading?" which may be read to the class or given as a speech while the listeners criticize the organization and effectiveness of the theme.
8. Select some concepts or themes and assign pupils to cite pieces of literature which substantiate each.

F. To present written materials orally:
1. Play records of a "good" and a "poor" oral reading.
2. Tape record and play back student oral reading attempts.
3. Have pupils note and analyze characteristics of news reporters and other readers on TV.

4. Provide opportunities for pupils to read orally to many different audiences.
5. Assign pupils to tell the story they liked best as a child.
6. Provide situations in which books may be shared in small group discussions to answer questions such as: How are our books alike? How are they different? Which book reported on would I like most to read?
7. Teach basic principles of speech giving.
8. Provide opportunities for choral reading.
9. Develop a class set of directions for preparation of oral presentation or written material.

G. To understand the importance of reading and ways to satisfy intellectual curiosity through reading:
1. Maintain a room library and stimulate pupils to participate in selection of materials.
2. Inform pupils of new materials and new authors.
3. Suggest materials to pupils according to their individual reading interests.
4. Have pupils prepare bibliographies that are divided into specific areas of interest.
5. Provide free reading periods during the school year.
6. Provide opportunities for pupils to discuss reading through sharing opinions about books in small groups as well as class discussions.
7. Help pupils make use of the city library and other available libraries.
8. Review books and read parts of them to the students.
9. Arrange for "resource persons" who can stimulate readings.
10. Encourage pupils to note public speakers', especially ministers', frequent reference to materials read.
11. Assign interviews with successful people who have deep and lasting reading habits.
12. Assign a definite article to each pupil which he will read and report orally.
13. Encourage pupils to build personal libraries.
14. Introduce Pocket Books or other inexpensive editions to stimulate pride in ownership of books.
15. Introduce pupils to and encourage them to use the book section of newspapers and magazines.
16. Conduct lessons which discuss such questions as, What have you previously read by or about this author? Does this selection relate to anything occurring in the world now? What mental pictures did

you get from this selection? Did these mental pictures remind you of anything? Would you have acted the way the characters did in this story? Why or Why not?

H. To make accurate self-evaluations of progress in reading:
1. Point out to pupils individually the relationship of success and failures in preparing class assignments to competence in reading.
2. Prepare a self-evaluation check list appropriate for reading in the language arts and encourage pupils to use it periodically.
3. Provide opportunities for students to take speed and comprehension tests to determine growth in both speed and accuracy of reading.
4. Study evaluation of competence in reading by use of class evaluation of oral and written reports as to their comprehensiveness and accuracy.
5. Organize "interrogation periods" in which a pupil leader asks questions about material read and evaluates responses.
6. Help pupils analyze their responses to tests or other written assignments to determine how wider or more accurate reading would have produced a more adequate response.
7. Teach pupils to check habitually the adequacy of their outlines or summaries of materials read.

Reading Skills and Habits Needed in the Social Studies

I. A good reader in the social studies class should be able to:

A. Acquire the vocabulary of the social studies.
1. Having an interest in words as tools of communication and of thought.
2. Using thought processes as well as memory to develop an adequate social studies vocabulary.
3. Having a systematic, continuing method of word study for social studies vocabulary building.

B. Find intrinsic motivation for reading social studies material.
1. Having an interest in the content that can be acquired through social studies reading.
2. Recognizing that social studies reading may be pleasurable.
3. Desiring to discover the truth about social situations by wide, well-selected reading.

C. Comprehend the material of social studies.
1. Using graphs, charts, tables, pictorial presentations including maps and globes, and other social studies materials to gain social studies concepts.

2. Using methods for organizing materials, locating specific facts, and interpreting abstract ideas.
3. Understanding the basic concepts of time and space.
4. Understanding chronological order and the relationships between past and present.
5. Comprehending sequences of events, groups of simultaneous events, cause-to-effect and effect-to-cause relationships.

D. Adjust speed of reading to purpose and type of content.
1. Determining purpose for the reading of particular items and appropriate speeds for reading them.
2. Recognizing types of content, the relative difficulty of comprehension, and appropriate speeds for reading each type.

E. Use library methods to locate materials.
1. Knowing sources of social studies materials.
2. Knowing how to locate and use sources to find specific kinds of social studies material.

F. Read social studies material to achieve specific purposes.
1. Solving problems of social significance.
2. Understanding general significance of a selection.
3. Discovering specific details.
4. Answering specific questions.
5. Evaluating statements.

G. Make accurate self-evaluations of progress in reading in the social studies.
1. Realizing the importance of self-evaluation.
2. Using a self-evaluation check-list periodically.

Illustrative Methods and Devices A High School Social Studies Teacher May Use to Improve Reading of Materials in His Classes

I. Methods that might be used to help pupils in the social studies:

A. To build vocabulary:
1. Help pupils to correlate the new words or terms with a current event to show their importance to the particular age group.
2. Send pupils directly to the dictionary for brief periods of study of a word, have them use the different meanings in meaningful sentences, determine which of these sentences best expressed the intended meaning of the word in the context being studied.
3. In building background, call attention to new words in class discussion. Place new words on the board, or duplicate on discussion sheets,

in sentences which give meaning, and illustrate how these discussions can be applied to later uses of the word as the pupil needs them. (New words are either individual, as they stem from personal activities, or of class significance in connection with units or projects.)

4. Give pupils experiences such as the following to help them recognize the various meanings of words: The word "mandate" is first encountered as "mandamus" in the Marbury vs. Madison case. Later in the Tyler administration, the students read that Polk's election was considered a "mandate" from the people. Discuss the new meaning or the variation of the word. Later, when in discussing the League of Nations "mandates," it is not difficult to refer to the earlier meanings and point out the differences.
5. Hold daily discussion of words and terms giving special attention to word roots and to shades of meanings. After such study, relate the words or terms to the assignment.
6. Use Latin derivatives and prefixes to increase vocabulary. For example, make clear such a word as "monotheism" by referring to such familiar words as "monotone" and "monoplane."
7. Have pupils underline new words in the text and write the meanings at the bottom of the page.
8. Help pupils to work on the pronunciation of difficult words.
9. Have pupils tell what they think a word means from the context.
10. Encourage pupils to use difficult words in sentences of their own.
11. Teach pupils how to make and use a personal card-file dictionary of words of interest and of value to them. Include on each card the word, its pronunciation, its meaning, and its use in a sentence.
12. Help pupils understand how words are tools of communication rather than problems to be solved.
13. Teach pupils thought methods, rather than memorization alone, for gaining word power in pronunciation, recognition, meaning, and spelling.
14. Encourage pupils to add the words in the glossary at the back of the book to their vocabularies.
15. Teach pupils to relate new words to various language sources and to their acquaintance with roots, prefixes, and suffixes in order to gain meanings readily.

B. To find intrinsic motivation for reading social studies material:

1. Project questions or problems by taking the critical viewpoint of the principles presented or by taking a contrary opinion so the class will need to justify their opinion.
2. Pose some questions that the material should answer.

3. Assign a project that requires reading of description or directions such as the making of a globe.
4. Encourage statement of opinions; then challenge pupils to bolster their opinions by reading.
5. Employ the "mystery" element or the "build-up" to catch interest; then ask pupils to read to satisfy their curiosity.
6. Tell pupils a story up to a crucial point; then assign reading to find out the conclusion of the story.
7. Tell pupils a story, but leave out the names of those involved; then assign reading in order for them to identify the characters.

C. To comprehend the materials of social studies:
1. Recall the experiences of former pupils in their initial contact with the material and plan ways to help present pupils to avoid anticipated difficulties.
2. Develop a list of resource materials that are readily available for use and adapt it to individual needs.
3. Ask pupils to relate vacation and other experiences and to bring available types of illustrative material from their experiences to make social studies readings more meaningful.
4. Use films, pictures, stories told by members of the class, displays, and maps to illustrate readings in the social studies.
5. Stress current news in government classes to show that the text material is in action at all times with such activities as: take trips to court during a study of the judiciary; assign one or two pupils to accompany the city manager at his work during an entire day and report to the class; use mock sessions of Congress, debates, panel discussions, and oral reports to clarify meanings.
6. Use films, recordings, drawings, opaque projections, dramatizations, cartoons, models, pantomiming, storytelling, and exhibits to add meaning to materials read.
7. Ask pupils to bring clippings or pictures relating to something they have studied such as picture of Mayflower II when or after studying about the Pilgrims.

D. To adjust the speed of reading to the purpose and to the type of content:
1. Point out that different material, different subjects, and different paragraphs within the same story have great variance in the degree of readability and comprehension.
2. Develop the idea that it would be impossible for all pupils to cover the same material in the same time and that each must try to adjust his reading speed to his comprehension level.

3. Adjust the length of the daily assignments to the estimated average speed of reading of the group.
4. Teach the place and the value of skimming in preparation of assignments.
5. Instruct in the methods of reading for the varied purposes of reading the same, similar, or different materials.
6. Early in the school year, spend one week or more on informal teaching and testing the pupils' rate and comprehension. Encourage pupils to experiment with different rates for different types of material and different purposes for reading.
7. Stress intensive reading by suggesting periodically the proper way to read a textbook: (a) reflect on chapter topic, (b) read preface material and unit titles, (c) read questions and study vocabulary at end of chapter, (d) read chapter material, and (e) check questions again seeing how well material was read.
8. Advise those who have difficulty understanding or retaining the information to take notes or outline the material.
9. Have students first read chapter titles and section headings and from them formulate questions to be answered by reading.

E. To use library methods to locate materials for social studies assignments:
1. Early in the year, take pupils to the library and help them in observing and practicing library procedures.
2. After a visit to the library, have pupils ask and discuss questions about library usage.
3. Teach library skills in special projects such as research reports and predictions. Give assignment sheets to pupils with suggestions in outline form, and have them use original sources and confirmed eyewitness accounts.
4. Teach the use of Readers Guide, Card Catalog, and other aids in locating material.
5. Give each pupil two or three cards with the names of people, places, or events listed on them. Instruct the pupil to use any textbook (except his own) or any reference book available to find data on his topics. Throughout this exercise, help pupils who need help with the use of sources.

F. To achieve specific purposes:
1. Motivate pupils to read for specific purposes such as: locating a certain fact, answering a certain question, determining a general concept, verifying information or opinion, and comparing different points of view.

2. Discuss in class the steps to follow in problem solving.
3. Point out the need for understanding why there are conflicting points of view on many social problems and how, by wide reading and critical thinking, an individual can develop his own point of view.
4. Make active use of projects which aid in clarifying meanings, aid in retention, stimulate critical thinking, and aid in developing initiative and planning, such as, reading related materials, outlining material for retelling, publishing a newspaper, and exhibiting displays of pictures or other materials.
5. Use the discussion method which encourages each pupil to give his own opinions and to explain why he arrived at his conclusions.
6. Use tests which include reading excerpts from actual historical documents and involve the use of critical, analytical thinking to answer the questions.
7. Develop a pattern of logical thought and a pattern of analysis by class discussions of the part emotions and vested interest play in history.
8. Use analysis of current news to estimate truth or falsity.
9. Ask examination questions that involve reflective thinking rather than memory of facts.
10. Use debate-type presentation of beliefs and supporting factual evidence to teach pupils how to collect and evaluate facts and how to relate facts to points in an outline.
11. Hold class discussions in which pupils express their own viewpoints and listen to those of others and then attempt to select the viewpoint which seems to be tenable in the light of the evidence.
12. Teach pupils to locate the facts about an area of concern; then determine the truth or falsity of statements about it.
13. Draw a pupil into expressing an opinion based on material read; then ask him to defend his opinion by showing how the material read is related to it.
14. Develop in pupils a habit of determining the implications of historical events for present day situations.
15. Teach pupils to read critically, that is, to look for fact rather than opinion, to consider the qualifications of the author in the area on which he writes, and to test whether the idea presented is consistent with known facts.

G. To make accurate self-evaluations of their progress in reading:
1. Point out to pupils individually the relationship of successes and failures in preparing class assignments to competence in reading.

2. Prepare a self-evaluation check list appropriate for reading in the social studies and encourage pupils to use it periodically.
3. Study evaluation of competence in reading by use of class evaluation of oral and written reports as to their comprehensiveness and accuracy.
4. Organize "interrogation periods" in which a pupil leader asks questions about material read and evaluates responses.
5. Help pupils analyze their responses to tests or other written assignments to determine how wider or more accurate reading would have produced a more adequate response.
6. Teach pupils to check habitually the adequacy of their outlines or summaries of materials read.

Reading Skills and Habits Needed in Science

I. A good reader in a science class must be able to:

A. Utilize sources to locate materials.

1. Indexes of books.
2. Tables of contents.
3. Glossaries.
4. Card catalogues in libraries.
5. *Reader's Guide to Periodical Literature.*
6. General references.
7. Newspapers.
8. Specialized books, manuals, pamphlets and abstracts.
9. Footnotes.
10. Literature from manufacturing companies including catalogues.

B. Adjust reading speed to the type and difficulty of the material and the purpose for reading.

1. Having a conscious or subconscious realization of a purpose for reading the material.
2. Having a conscious or subconscious realization of the reading difficulty of the material.

C. Comprehend written material.

1. Determining what the pupil should get from the passage.
2. Determining the author's interpretation of controversial items.
3. Understanding meanings of specialized presentations as:
   a. Technical symbols in science and mathematics.
   b. Technical words.
   c. Graphs.
   d. Charts.
   e. Diagrams.
   f. Scales.
   g. Formulas.
   h. Equations.
   i. Cross section and longitudinal models.
   j. Maps, pictures, and flow charts.
4. Understanding the meanings of non-technical words and phrases used in science context.

5. Determining the general significance of content of: sentences, paragraphs, sections, chapters, books, illustrations, charts, graphs, and pictures.
6. Recognizing important details such as:
   a. Isolated facts.
   b. Evidence or the lack of evidence to buttress main ideas.
   c. Answers to specific questions.
7. Recognizing familiar portions of new words.
8. Using roots, prefixes, and suffixes.

D. Evaluate the material intelligently.

1. Understanding its relevance to the problem.
2. Developing standards for establishing the competency of the source.
3. Estimating reliability of the content.
4. Comparing or contrasting concepts gained with previously held concepts.
5. Correlating written textbook content with everyday experience.
6. Determining author's purpose.
7. Recognizing relevance of empirical results to author's purpose.
8. Recognizing style of presentation of facts (objective or subjective).
9. Understanding the difference between results and opinions or facts and opinions.
10. Noting the significance of date of publication.

E. Use the content of written material in situations requiring scientific method.

1. Formulating hypotheses.
2. Collecting evidence.
3. Evaluating evidence.
4. Organizing pertinent evidence.
5. Drawing conclusions.
6. Testing conclusions.

F. Apply concepts gained from the reading material to confronting situations such as:

1. Experiments.
2. Problems.
3. Discussion.
4. Further reading.
5. Observation.
6. Everyday living.

G. Develop the habit of extensive reading in the science field to stimulate and to satisfy intellectual curiosity and to participate more effectively in a physical world.

H. Follow directions.

1. Recognizing the sequence of steps.
2. Recognizing the relevance of steps in sequence to the purpose of the directions.

I. Make accurate self-evaluations of progress in reading scientific materials.
   1. Realizing the importance of self-evaluation.
   2. Using a self-evaluation check-list periodically.

ILLUSTRATIVE METHODS AND DEVICES A HIGH SCHOOL SCIENCE TEACHER MAY USE TO IMPROVE READING OF MATERIALS IN HIS CLASSES

I. Methods that might be used in teaching science pupils:

A. To utilize sources to locate materials such as:
   1. Indexes, tables of contents, glossaries, the card catalogue, and the *Reader's Guide to Periodical Literature,* dictionaries, bibliographies, and reference cited sections.
      a. Conduct "treasure hunts" for information requiring the use of these sources.
   2. General references, newspapers, specialized books, manuals, and pamphlets.
      a. Discuss where these sources are found in the library and the information that can be found in them.
      b. Discuss the reliability of references such as newspapers.
      c. Assign reports, experiments, and research problems requiring the use of these sources.

B. To vary reading speed:
   1. Compare the time necessary to read a section in a science book on the seventh grade level with one the same length that is written for high school juniors.
   2. Compare time necessary to read a section of a science book when the reader wants to generalize with the time necessary to read the same section when he wants to find specific details.
   3. List purposes for which pupils might read science materials and estimate the possible changes in speed of reading.

C. To comprehend written material:
   1. Understanding technical symbols:
      a. Discuss the meaning of new symbols that will be appearing in the reading assignments.
      b. Write the meaning of the technical symbols in sentence form.
      c. From experimentation, derive symbols that are new to the pupil.
   2. Understanding technical words:
      a. Discuss etymology of important scientific terms.
      b. Give opportunities to spell and use technical words in oral and written reports.
      c. Discuss the meaning of new words that will be appearing in reading assignments.

d. As a class exercise compile a science dictionary of new, technical words.
e. Teach pupils how to develop a word-card-file of science words and symbols.
f. Develop crossword puzzles with science words.
g. Explain how to use context clues to get meaning and provide practice opportunities in using them.
h. Encourage the writing of poetry and jokes with a science motif.
i. Require pupils to pronounce and spell words correctly.
j. Emphasize the use of the dictionary while pupils are reading science material and preparing reports.
k. Use new words in class discussion, explain, and discuss them.

3. Understanding graphs and charts:
   a. Bring in illustrations of various types of graphs and explain them.
   b. Discuss the purpose of specific graphs.
   c. Define the meaning of the scales on the horizontal and vertical lines.
   d. Show pupils how to compare two quantities at different times in a single line graph.
   e. Show pupils how to compare the quantity of different items at one period of time in a multiple line graph.
   f. Give practice problems for pupils to graph, using various types of graphs.
   g. Propose conclusions that might be drawn from a specific graph and have pupils decide on their validity.
   h. Have each pupil bring a graph to class and explain it.
   i. Show how graphs are derived.
   j. Discuss the purpose of specific charts.
   k. Give practice problems for pupils to chart.
   l. Discuss the relationship of specific charts to a specimen or model.
4. Understanding diagrams:
   a. Discuss the purpose of specific diagrams.
   b. Discuss orientation of diagrams.
   c. Give practice problems for pupils to diagram.
   d. List and illustrate as many conclusions as possible that may be drawn from a specific diagram.
   e. Make drawings of items described in science readings such as amoeba and crayfish.
5. Understanding scales:
   a. Assign pupils to become acquainted with differing scales and to compare and discuss the measurements found on each.

b. Give an opportunity for pupils to make individual readings of all scales available.
c. Conduct experiments requiring the plotting of scale readings.

6. Understanding formulas and equations:
   a. Hold class discussion on the meaning of new formulas and equations that appear in the reading assignments.
   b. Assign pupils to write the meaning of formulas and equations used in class in sentence form.
   c. From class experiments, have pupils derive formulas and equations that are new to them.
   d. Emphasize general rules (such as the balance of electrical charges) that affect all equations and formulas.
   e. Show pupils how to identify factors or facts that the formula implies.
7. Understanding models:
   a. Discuss the purpose of specific models with the class.
   b. Have students make models.
   c. Use models for student demonstration.
   d. Teach the making of models of various items of interest in the class.
8. Understanding and summarizing sentences and paragraphs:
   a. Show pupils how to restate sentences using their own words.
   b. Assign the writing of newspaper headlines that summarize paragraph content.
   c. Discuss the relationship of the content of one paragraph to that of another.
   d. Show students how to look for different sources and presentations of one concept.
   e. Discuss the relationship of the content of one paragraph to an entire section or chapter.
   f. Outline a chapter on the chalkboard after hearing a one-sentence summary by the pupils of each paragraph.
   g. Explain to the pupils how to write or give orally a summary of paragraph content and provide practice in using this skill.
   h. Help pupils to determine the author's style of paragraph organization in text and reference books and to make use of this organization in understanding the paragraph.
9. Understanding sections and chapters and entire books:
   a. Direct the pupils in the writing of chapter summaries.
   b. Discuss the relationship of the content of one chapter to that of another.

c. Discuss the relationship of one chapter to the entire book.
d. Outline a book with a single sentence summary of each chapter and use as unit or semester review.
e. Write statements that may be concluded from experimental evidence and discuss them with the class.
f. Assign the preparing of oral and written book reports, after the class has developed its own outline of content for such a report.

10. Recognizing important details:
    a. Give specific questions for pupils to answer as they read.
    b. Give specific questions that pupils can answer after reading.
    c. Have the pupils determine the topic sentence of a paragraph and then find evidence to support this idea.
    d. Agree on the main idea of a paragraph or section and have pupils find evidence to support this idea.
    e. Require pupils to jot down important details as they read and then rank them in importance according to established criteria.
    f. Teach pupils how to get meaning of a paragraph taken from text with keywords and details removed.
    g. Assign pupils to prepare a short test over the section.

D. To evaluate reading material intelligently:
    1. With the pupils develop criteria to determine the validity of material such as author background, position, experience with the subject, possible prejudices, and the date of the writing.
    2. Develop a scientific hypothesis and have students find information concerning it from competent and incompetent sources and distinguish between them.
    3. List "authorities" in specific scientific areas and discuss whether their testimony should be accepted or not and, if so, on what topics.
    4. Find differing views on a controversial subject and discuss which one represents the most likely "truth" and why.
    5. Compare actual specimens and/or models with pictures, diagrams, and written material and show pupils how to determine the validity of the pictures, diagrams, and written material.

E. To use the content of written material in situations requiring scientific method:
    1. Provide projects in which pupils use information read about weather in understanding and anticipating weather changes.
    2. Provide opportunities for pupils to predict weather changes and compare their predictions with those of the weather bureau as well as with the actual weather change that occurs.

3. Teach pupils the application of principles read in the textbook to laboratory situations and make them conscious of the six steps used in the scientific method. (See Section E, page 17.)
4. Develop projects in which pupils have an opportunity to evaluate advertising by applying the steps used in the scientific method.

F. To apply concepts gained from the reading materials to experiments and problem solving:
1. Use experiments and problems in which the pupils must follow exacting written instructions.
2. Use experiments and problems in which the pupils must apply generalized principles that they have read.
3. Teach pupils to derive their own generalizations or principles from a set of examples or illustrations collected from their reading.
4. Show pupils how to derive their own experiments and problems that are a result of their reading.
5. Use accurate reading and interpretation of test questions as part of the basis for grading examinations.
6. Have pupils keep accurate records of experiments carried on in the classroom.

G. To develop the habit of extensive reading in the science field:
1. Maintain a room library containing science books, magazine articles, and photographs.
2. Use bulletin board to advertise available materials including materials and literature from industries and businesses.
3. Inform pupils of new books and magazine articles that have been written on science.
4. Suggest books to individual pupils according to their interests in science.
5. Prepare bibliographies that are divided into specific topics in science.
6. Provide for "free reading" periods during the school year.
7. Help pupils make use of the science section of the city library and other available libraries.
8. Take advantage of school discounts and group buying to enable pupils to buy selected books for their own science library.
9. Briefly discuss interesting science material that you have read.
10. Encourage pupils to write short plays based on scientific facts and events, tape record, and play back to the class to stimulate interest in reading.
11. Assign pupils to prepare one-page summaries of their favorite science literature reading, to exchange these summaries, and then, in turn, tell each other about what they have read.

12. Assign articles from magazines for student reports in class.
13. Give short unfinished reports on books and articles and challenge pupils to finish them.
14. Post lists of available books and periodicals with brief evaluation of each item and change these lists frequently.
15. Require pupils to read and report on one article each week.
16. Use a point system for outside reading and give recognition—grade, credit—for extensive reading.

H. To follow directions:
1. Require the pupils to number the consecutive steps when reading directions.
2. Discuss the reasons for the particular sequence indicated.
3. Point out to pupils the value of reading the entire set of directions first to obtain a general understanding of purpose and method.
4. Require the pupils in the second, more deliberate reading of the directions to determine how the steps in sequence, if followed, will achieve the purpose.
5. Show, by demonstration, the value of rereading directions during the process of completing a long series of directions to be sure that they are followed exactly and in sequence.
6. After the completion of a project, when the purpose has not been achieved, restudy directions to see where the error has occurred.

I. To make accurate self-evaluations of progress in reading:
1. Point out to pupils individually the relationship of success and failures in preparing class assignments to competence in reading.
2. Prepare a self-evaluation check list appropriate for reading in science and encourage pupils to use it periodically.
3. Study evaluation of competence in reading by use of class evaluation of oral and written reports as to their comprehensiveness and accuracy.
4. Organize "interrogation periods" in which a pupil leader asks questions about material read and evaluates responses.
5. Help pupils analyze their responses to tests or other written assignments to determine how wider or more accurate reading would have produced a more adequate response.
6. Teach pupils to check habitually the adequacy of their outlines and summaries of materials read.

Reading Skills and Habits Needed in Mathematics

I. A good reader in the mathematics class should be able to:
A. Use efficiently the vocabulary of the subject.

1. Technical mathematical terms.
2. Terms, and their abbreviations, that are frequently used in mathematics.
3. Roots, prefixes, and suffixes that aid in understanding mathematical terms.
4. Literal numbers.
5. Alphabetical, operational, grouping and relationship symbols.

B. Read and interpret verbal problems.

C. Read and interpret materials used for showing functional relationships.
1. Rules, principles, and formulas.
2. Tables.
3. Charts.
4. Graphs.
5. Figures and diagrams.

D. Proofread to verify solutions and/or to locate errors.

E. Through extensive reading, recognize and make use of the quantitative data in newspapers, magazine articles, and books.

F. Acquire meaning from the statements of rules and definitions so they may be used with understanding.

G. Make accurate self-evaluation of progress in reading in mathematics.
1. Realizing the importance of self-evaluation.
2. Using a self-evaluation check list periodically.

ILLUSTRATIVE METHODS AND DEVICES A HIGH SCHOOL MATHEMATICS TEACHER MAY USE TO IMPROVE READING OF MATERIALS IN HIS CLASSES

I. Methods that might be used to help pupils in mathematics:

A. To develop vocabulary:
1. Teach pupils to recognize the contrast between the mathematical meaning of words and terms and their meanings in other areas of study.
2. Provide opportunities for the study of the meanings of new terms and for use in mathematical situations.
3. Accustom the pupils to the importance of using the glossary for pronunciation, spelling, and meaning of mathematical terms.
4. Teach pupils to recognize the relationship between new words and their parts to known words, prefixes, suffixes, and roots: mononomial-monoplane, binomial-bicycle, trinomial-tricycle.
5. Group mathematical words and terms in lists that are similar or dissimilar, such as synonyms, antonyms, and homonyms, and develop their specific mathematical meanings by comparison or contrast.

6. Explain the derivation of mathematical terms; for example, the word decimal comes from the Latin word *decem* which means "ten."
7. Stress the preciseness of mathematical vocabulary and show how this is applied in verbal problems and theorems.
8. Require the pupils to use the specific vocabulary of mathematics; for example, a rectangle is a parallelogram but a parallelogram is not always a rectangle.
9. List new words pertaining to the topic being studied and have the pupils learn to spell and define them.
10. Make copies of both general and mathematics dictionaries available and encourage pupils to make use of them.
11. Encourage the pupils to keep a personal card file of new words including spelling, pronunciation, definition, and use in a mathematical expression.
12. Use a committee of pupils to keep up bulletin board displays of important words in mathematics showing their origin together with families of words containing the same root but different prefixes and suffixes as well as appropriate synonyms, antonyms, and homonyms.
13. Teach the pupils how to obtain word meanings from the context of the sentence.
14. Teach the pupils to remember mathematical symbols through likeness to or abbreviation of the figure or term they represent.
15. Insist upon accurate usage of names of symbols; for example, do not allow references such as "that thing there" or "that doohicky."
16. Encourage pupils to bring to class mathematical symbols which they find in newspapers, advertisements, trademarks, and cartoons and discuss them as to origin, significance, and meaning.
17. Provide opportunities in which the pupils change sentences or phrases into symbolic expressions, such as, "three times a number" is "3n."
18. Place emphasis upon the proper symbols for labeling and the correct use of units, such as, mi./hr., ft./sec., lb./cu. ft.

B. To read and interpret verbal problems:

1. Teach the understanding and proper use of cues in verbal problems, such as "is" may mean "equals" and "of" may mean "multiply" in specific situations.
2. Explain to the pupil that in solving problems he must determine (1) what facts are given, (2) what he is trying to find out, (3) what operations should be used, and (4) in what order. For pupils having difficulty ask them to write out the following: (1) facts given, (2)

what is to be found, (3) process or processes to use, (4) steps in proper order for solving the problem; and, if the pupil still has difficulty, help him to solve the problem using small numbers first.

3. Teach the pupil who has difficulty in interpreting mathematical terms to substitute synonyms that he can understand.
4. Show the pupil how the verb in a verbal problem often acts as the equal sign between two parts of an equation, as, "Mary's age two years ago was 10 years less than twice her age now." X—2=2X—10.
5. Emphasize the value of slow reading and rereading of verbal problems observing details including basic parts of sentences such as subjects and verbs, parts of speech, and punctuation.
6. Set up a learning situation in which pupils individually, or in committees, examine a number of supplementary texts and list the steps in the plan of attack for solving verbal problems suggested by various authors; and from these lists develop a master plan.
7. Provide supplementary verbal problems for the class by listing problems of varying levels of difficulty on separate sheets.
8. Work sample verbal problems with the class and list the steps used in the plan of attacking the problem.
9. Use different types of diagrams to illustrate the steps in the solution of a verbal problem. For example: How many nickels, dimes, and quarters are there in $5.75 if there are twice as many dimes as nickels and two more quarters than dimes?

Kind	*Number*	*Value*
nickel	X	5X
dime	2X	10(2X)
quarter	2X + 2	25(2X + 2)

$$5X + 10(2X) + 25(2X + 2) = \$5.75 \qquad X = 7$$

10. Give pupils practice in reading directions in constructing figures, reading micrometers, and using the slide rule, and test their ability to follow directions.

C. To read and interpret materials showing functional relationships:

1. Provide classroom experiences in understanding what the horizontal and vertical scale each represent and the relationships between them in a chart or graph.
2. Assign the pupils to draw logical conclusions from the data represented on a graph or chart and to determine conclusions implied but not justified by the data.
3. Provide exercises in which the pupils portray the relationships among sets of data by preparing tables, graphs, charts, figures, and diagrams.

4. Instruct the pupils to select graphic and tabular representations from newspapers and magazines in such areas as sports and finance, and explain the relationships represented to the rest of the class.
5. Collect pictures and drawings relating to mathematics, post them on the bulletin board, and encourage pupils to interpret the relationships represented and to suggest possible theorems and generalizations which might apply.
6. Show pupils how verbal explanations may often be made clearer by accompanying graphic representations.
7. Help the pupil to understand the meanings and relationships of figures and diagrams in geometry by giving him the opportunity to see and handle the figures produced from cardboard, thin wood, plastics, or other material.

D. To proofread to verify solutions and/or to locate errors:
1. Encourage pupils to read a problem orally when they have difficulty with any of the terms used or details mentioned when they read the problem silently.
2. Instruct the pupils to read the total problem for a general understanding and then to read it analytically by parts to determine the steps necessary for solution.
3. Make notations in the teacher's desk copy of "trouble spots" in the reading of problems and prepare devices to cope with them as they occur.
4. Prepare exercises in which pupils rewrite incorrect statements of problems for drill in proofreading.
5. Encourage the development of the ability to recognize a reasonable answer and the practice of rereading a problem if the first solution to the problem seems to be unreasonable.

E. To read extensively and thus recognize and make use of the quantitative data in newspapers, magazine articles, and books:
1. Encourage pupils to read books and articles on such subjects as astronomy, navigation, history of mathematics, and the development of the calendar, and make reports on the mathematical implication of the content.
2. Prepare a reading list of biographies of famous mathematicians and encourage pupils to read and report on these biographies.
3. Make the pupils aware of the importance of mathematics by frequently referring to the use of quantitative data in current magazines and daily newspapers.
4. Use mathematical fun books, puzzles, and games to stimulate interest in reading mathematical material.

5. Keep a class mathematics scrapbook of clippings, including pictures, drawings, trick problems, magic squares, and new developments in mathematics, that are contributed by class members.
6. Cooperate with the school librarian in preparing lists of books and library exhibits of material on mathematics.
7. Keep a classroom library of mathematics books and magazines for supplementary reading.
8. Make available to pupils such magazines as *Popular Mechanics, Popular Science, Mechanics Illustrated,* and *Kansas State Engineer* which contain interesting articles, pictures, and problems pertaining to gear ratios, lumber dimensions, chemical mixtures, scale drawings, and many other aspects of mathematics.
9. Encourage pupils to read books about mathematics as a career or about other careers that require mathematics.

F. To acquire meaning from the statements of rules and definitions so they may be used with understanding:
1. Use the inductive method of arriving at rules and definitions by asking pupils to develop their own rules or definitions after many illustrations are given; then compare this rule or definition with that of the author.
2. When applying a rule or definition to a specific situation, ask the pupil to state the generalization in his own words and then show the relationship to the specific situation.
3. Ask pupils to state the converse of a rule or definition and test its validity.
4. Make application of rules to real-life situations, such as, comparing the number of steps required to walk around two sides of a park with the number of steps to walk through it diagonally to illustrate that the shortest distance between two points is a straight line; also, show how this is related to the Pythagorean Theorem.

G. To make accurate self-evaluation of progress in reading in mathematics:
1. Point out to pupils individually the relationship of success and failure in preparing class assignments to competence in reading.
2. Prepare a self-evaluation check list appropriate for reading in mathematics and encourage pupils to use it periodically.
3. Organize "interrogation periods" in which a pupil leader asks questions about material read and evaluates responses.
4. Help pupils analyze their responses to tests or other written assignments to determine how wider or more accurate reading would have produced a more adequate response.

5. Ask pupils to bring to class actual or fictional stories of loss and inconvenience caused by inaccurate reading of mathematical statements.

Reading Skills and Habits Needed in the Industrial Arts

I. A good reader in the industrial arts class should be able to:

A. Use the vocabulary of the subject.
1. Names of tools, equipment, and materials.
2. Brand names.
3. Common abbreviations used (including symbols as ° ′ ″).
4. Technical and special terms.

B. Follow written direction for shop procedures.
1. Assembling materials.
2. Organizing the work area.
3. Proceeding by steps or units in sequence.
4. Checking process and products periodically.
5. Making the final asssembly.
6. Finishing the product.

C. Read illustrations and diagrams.
1. Visualizing the whole finished product.
2. Identifying parts.
3. Recognizing symbols.
4. Applying the legend or scale.
5. Interpreting correctly the illustration or diagram.

D. Read the catalogs, journals, and advertisements pertaining to the industrial arts.
1. Index—table of contents.
2. Quantity-quality clues.
3. Approval and/or ratings by appropriate agencies or users.
4. Discount or wholesale symbols.
5. Critical analysis of description of specifications and prices.
6. Order forms.

E. Develop skill in reading other special materials.
1. Color charts.
2. Design (balance, size, and weight).
3. Markings on dials or scales on equipment.
4. Warranties and instructions for use and care of equipment.
5. Service procedures and parts lists.
6. Details on illustrations or diagrams.
7. Maintenance and lubrication charts.

F. Do extensive reading in the field.
   1. Trade publications and professional magazines such as *School Shops*.
   2. Information about careers.
   3. Avocational possibilities.
   4. Reference reading, as publications by Hardwood Associations.
   5. Books relating to individual interests.

G. Develop differentiated reading speeds.
   1. Skimming.
   2. Reading for details.
   3. Reading for general significance.

H. Make accurate self-evaluations of progress in reading in the industrial arts.
   1. Realizing the importance of self-evaluation.
   2. Using a self-evaluation check list periodically.

ILLUSTRATIVE METHODS AND DEVICES A HIGH SCHOOL INDUSTRIAL ARTS TEACHER MAY USE TO IMPROVE READING OF MATERIALS IN HIS CLASSES

I. Methods that might be used to help students in the industrial arts:

A. To develop vocabulary:
   1. Require the pupil to identify all tools and equipment specifically—not just "that thing-a-ma-jig" or "that thing you use to ——."
   2. Use strip and sound film provided by equipment manufacturers and other sources.
   3. Penalize the pupil for asking for or bringing the wrong tool.
   4. Teach significant words used in textbooks, references, and charts.
   5. Teach symbols directly—especially in drafting.
   6. Require that all plans and diagrams have proper names, legends, and symbols and be drawn according to American standards.
   7. Keep special word lists for technical terms—give periodic tests.
   8. Direct pupils to keep a card file of terms to study for memorization.
   9. Require pupils to identify all wood grades by their names: F.A.S., common, select, construction, etc.

B. To follow written directions:
   1. Require, after working drawings are made, step-by-step plans and a materials list along with tools to accomplish the task.
   2. Have pupils draw up plans, exchange plans, and see if they are clear enough for another pupil to follow.
   3. Test comprehension by requiring the pupil to explain his step-by-step plans to the instructor.

4. Have pupils assemble and disassemble simple machinery according to the manufacturer's assembly directions or charts.
5. Draw up plans lacking one or more steps and have pupils identify and supply omitted steps.
6. Use simple games that require accurate following of written directions.
7. Require pupils to read and explain directions furnished with machinery before they use it.
8. Give both written and manipulative safety tests before a pupil begins work on a machine.

C. To read illustrations:
1. Use direct teaching of illustrations in drafting.
2. Have pupils draw working plans from pictures in catalogs, magazines, or actual objects.
3. Show pupils how to expand scale drawings to actual size and the reverse.

D. To read catalogs, journals, and advertisements pertaining to the industrial arts:
1. Provide a readily accessible shop library.
2. Have pupils locate advertisements of needed materials and write critical descriptions and compare prices and specifications.
3. Have pupils find in a catalog at least two of each piece needed for each job and compare them as to specifications, availability and price.
4. Help pupils to make up orders from catalogs for the hardware needed for a job.
5. Require pupils to secure from literature materials list and prices and to make cost estimates for every job.
6. Have on display similar looking tools and materials that vary in quality and require pupils to determine advantages and disadvantages of each from reading.
7. Have pupils make reports on different tools or equipment from *Consumer's Guide* or similar sources.
8. After hardwaremen or tool salesmen have discussed the quality characteristics and have demonstrated their products to the class assign pupils to read to verify claims made.

E. To develop skills in reading other special materials:
1. Use charts to teach dial markings.
2. Assign pupils the responsibility of servicing machines according to manufacturers' instructions.

3. Have pupils keep notebooks including drawings, specifications, and service policies.

F. To do extensive reading in the field:
1. Keep a shop library.
2. Use the *Kuder Book List.*
3. Take pupils to the library.
4. Have librarian feature industrial arts books at least once during the year.
5. Have counselor suggest vocational reading.
6. Subscribe to trade journals for the class.
7. Designate certain days as "reading days."
8. Follow up the showing of commercial films and talks by representatives from local industry and trade unions with assigned readings on vocational possibilities.
9. Have pupils read extensively and give reports with demonstrations on wood used in furniture.
10. Provide opportunity for class discussions which require that the pupils do some reading on the subject.
11. Call attention to interesting articles and books about industrial arts subjects.

G. To develop differentiated reading speeds:
1. Encourage pupils to use skimming to locate specific information in books and magazines.
2. Have pupils read a set of directions and list the steps in order.
3. Assign pupils to read magazine articles on a specific topic and report the main points to the class.

H. To make accurate self-evaluations of their progress in reading:
1. Point out to pupils individually the relationship of successes and failures in preparing class assignments to competence in reading.
2. Prepare a self-evaluation check list appropriate for reading in the industrial arts and encourage pupils to use it periodically.
3. Help pupils analyze their responses to tests or other written assignments to determine how wider or more accurate reading would have produced a more adequate response.
4. Teach pupils to check habitually the adequacy of their outlines or summaries of materials read.

PART III

Research in Reading at The University of Kansas

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During the past twelve years 18 research investigations in reading that directly concern students in grades 7-12 were completed at the University of Kansas. Studies of reading in the elementary school were purposely omitted from this compilation. However, several studies of reading in the elementary school included grades 7 and 8 in their analyses and therefore were added to the list.

The 18 studies have been divided into five areas for the convenience of the reader: readability, retarded readers, reading improvement, reading factors, and bibliographical studies of reading materials. While some studies relate to more than one area, each was classified in the area to which it principally referred. Within each area, the studies were listed in chronological order.

While the surveys are brief, they contain most of the pertinent information from each study. More information may be secured by consulting the original copies of these theses which are available at the University of Kansas Library on inter-library loan.

STUDIES OF READABILITY

FORBES, FRITZ W. "A New Method for Determining the Readability of Standardized Tests Used in Counseling." Doctor's thesis, July, 1952.

In the words of the author "this study was carried out in order to determine objectively the reading difficulty of standardized tests commonly used in counseling and to develop a new method for determining the reading levels of these standardized tests."

Five readability formulas, Dale-Chall, Flesch, Lorge, Lewerenz, and Yoakam were applied to 27 selected standardized tests commonly used in counseling. The grade level scores obtained for each test from the 5 formulas were averaged to obtain a mean grade level reading difficulty score for each test.

To measure vocabulary difficulty three samples of 100 words each were taken from each standardized test. One each was taken from the beginning, middle, and end. Vocabulary tests were omitted from the samples. Words were given weights from 4 to 20, designating the frequency of use as indicated in the *Thorndike-Lorge Teachers' Word Book*. Words in the first 4,000 most

commonly used words in English were not assigned a weight. Weights for the three samples were totaled and divided by the number of words. This figure became the *index of vocabulary difficulty*.

Rank correlation between the *index of vocabulary difficulty* and the mean grade level scores of the five formulas was .94. When the Lewerenz formula was dropped, the correlation was .96. The correlation between the Dale-Chall formula alone and the mean grade level scores of the five formulas was .95.

Time required to complete the *index of vocabulary difficulty* was 30 minutes and the average for working a single formula on a single test was 2½ hours. In applying the formulas the entire test was used rather than a sample, which accounted for the large amount of time taken.

Objectivity of scoring was increased by using the *index of vocabulary difficulty* since no judgments are required by the scorer.

ANNIS, RUSSELL W. "An Analysis of Readability Factors within Three Novels Commonly Taught in High School." Master's thesis, September, 1953.

The three novels studied were *Ivanhoe* by Sir Walter Scott, *Silas Marner* by George Eliot, and *A Tale of Two Cities* by Charles Dickens. An attempt was made to study them in terms of literary merit, reading difficulty, and the interests of young people.

While all three novels have a high degree of literary merit, a critical analysis revealed that none are of such aesthetic merit as to be irreplaceable for any given student. *Ivanhoe* is criticized for inadequate character development, *A Tale of Two Cities* for its contrived plot and overt use of coincidence, and *Silas Marner* for its moralizing and improbability.

Two readability formulas, the Dale-Chall and Flesch, were used to determine reading difficulty. Average difficulty by grade level for the Dale-Chall and Flesch formulas respectively was found to be: *Ivanhoe,* grades 11 and 9; *A Tale of Two Cities,* grades 10 and 9; and *Silas Marner,* grades 8 and 7.5. The grade ranges of difficulty according to the Dale-Chall and Flesch formulas respectively were as follows: *Ivanhoe,* grades 6-16 for both formulas; *A Tale of Two Cities,* grades 5-16 and 4-12; and *Silas Marner,* grades 5-16 and 5-17.

A random survey of 100 University of Kansas students was made to determine whether or not high school instruction resulted in increased reading of the novels by authors studied in high school. While 84 per cent had read *Silas Marner* in high school, only 6 per cent of these students had read another novel by George Eliot; 56 per cent had read *Ivanhoe* in high school and 18 per cent of them had read another novel by Sir Walter Scott; 35 per cent had read *A Tale of Two Cities* in high school and 28 per cent of them had read another novel by Charles Dickens.

RAMSEY, ROBERT D. "An Analysis of the Readability and Difficulty of Two Eighth Grade American History Textbooks." Master's thesis, July, 1958.

The purpose of this study was to determine the readability and difficulty of a basic text and a supplementary text used in an eighth grade social studies class. Readability was interpreted as a measure of vocabulary and sentence length as used in the Dale-Chall formula. Difficulty was interpreted as all the factors, including conceptual difficulty and time spent in reading, which affect the success with which these eighth grade students read a basic and supplementary text.

The Dale-Chall formula revealed the average readability of the basic text to be grade 6.13 with a range of grades 4-11 and of the supplementary text to be grade 5.68 with a range of grades 5-10. Since the 123 students in the study were above average in reading ability, they were able to read the majority of both books with ease.

To measure the students' ability to read, comprehend, and interpret the material from the textbooks, six fifteen-question tests were constructed. One set of tests was made over the passage with the highest readability, one over the passage with the lowest, and one set over a passage representing the mean readability level of each book. All questions were four-part multiple choice questions; ten were factual and five were interpretive, requiring the student to apply information secured from his reading.

The tests were given, one each week, for a period of six weeks. Each student read the passage at his own speed, and a careful record was made of the time required to read it. The order of presentation of the six tests was as follows: basic text, passage lowest in readability, average readability, highest readability; supplementary text, passage lowest in readability, average readability, highest readability.

The major findings were:

1. The mean scores on the comprehension tests did not drop proportionately and uniformly as the readability level of the selections increased.

2. The average and top group in reading ability scored significantly higher on the fact questions than the interpretive questions while those low in reading ability did as poorly on one type of question as the other.

3. Most students were not sensitive to the importance of time, spending nearly equal amounts of time in reading selections of high and low readability.

4. Readability and difficulty are quite different when factors like the quality of comprehension and time taken to read a selection are taken into consideration.

5. The average readers profited most from reading these two textbooks, while the books were too difficult for the poor readers and not sufficiently challenging to the best readers.

Studies of Retarded Readers

Cowles, Frieda E. "A Study of Retarded Readers in a Junior High School." Master's thesis, September, 1948.

The purpose of this study was stated thus: "to determine whether pupils of retarded reading ability will profit from special instruction in reading given in an English class adapted to fit their special needs, and if they do profit, to gain some estimate of the extent."

Two experimental studies were made. In Study I, 23 seventh-grade pupils were selected whose mean reading age was 10 years 3 months, mean mental age 11 years 10 months, and chronological age 13 years 2 months. This group was given an extra fifty-minute period each day, five days a week, for 18 weeks, in which they received special reading instruction. The extra hour each day was obtained by omitting an elective subject, or a combination of physical education and music. In Study II, two comparable groups of children were used, an experimental group which received three extra thirty-minute periods of instruction each week for 18 weeks, and a control group who was allowed to do free reading, studying, or extra craft work during these three periods. The median I.Q. in both groups was 83.

The experimental group in Study I made a median gain of one year four months in reading as shown by using a second form of the *Iowa Silent Reading Test*. This was four times greater than normally expected for students of this group.

The experimental group in Study II made a median gain of one year in reading ability while those in the control group made a gain of six months in reading ability.

Retarded pupils did profit from the special instruction given in reading in an English class which was adapted to fit their needs.

Ridgway, Robert W. "The Administration of a Remedial Reading Program in the Baldwin, Kansas, Public Schools, 1949-50." Master's thesis, August, 1950.

The purpose was to develop an improved program of reading instruction in the Baldwin schools. It consisted of two phases, a program in the high school and one for the elementary school. A class in 9th grade English and a

class in 10th grade English were divided into 3 groups: (1) those deficient in rate of reading, (2) those deficient in vocabulary, and (3) those who were doing satisfactory work in reading. Group I was given tachistoscopic training by the author; Group II was given training in vocabulary and study skills by an English teacher; Group III met with another English teacher and was allowed to do free reading. Three twenty-minute periods were used each week for a nine-week period. Group I gained 1.6 grades in reading ability, 2.26 grades in comprehension, and 3.9 grades in rate of reading. Group II gained .52 grades in reading ability, .29 grades in rate of reading, and 1.57 grades in the ability to comprehend in the nine weeks.

No results were reported for Group III, nor for a second phase of the program which was undertaken the second semester.

While all gains for Group I were statistically significant, none of those for Group II were. No indication was given of intelligence levels of either group nor was any attempt made to equate them. No attempt was made to determine whether the gains were permanent.

BRUNING, HERBERT I. "A Study of the Readability, Interest, and Usefulness of Selected Materials for Retarded Readers in Grades Seven to Twelve." Doctor's thesis, May, 1954.

The subjects in this study were 92 pupils in grades 7-12 in the Emporia (Kansas) public schools. To determine retardation, a graduated scale was employed: those 1½ years below grade level for grade 7; 2 years below for grade 8; 2½ for grade 9; 3 for grade 10; 3½ for grade 11; and 4 for grade 12. The 47 pupils in grades 7-9 were divided into a control group of 26 and an experimental group of 21. The 45 pupils in grades 10-12 were divided into a control group of 20 and an experimental group of 25.

Students in the experimental groups were given opportunities over a period of six months to read from a list of 26 books. These books were of three types; adapted classics, specially written materials for retarded readers, and textbook or informational type materials. All of the 26 books were subjected to the Dale-Chall formula. Intelligence scores for all students were available from the *Otis Quick-Scoring Mental Ability Test* and pre-test and post-test scores from the *Metropolitan Reading Test (Advanced) Form T.*

The major findings were as follows:

1. There was no statistically significant gain from pre-test to post-test scores in reading comprehension, vocabulary, or total reading score for either the experimental or control groups. Thus, using "easy" materials for free reading by retarded readers does not, by itself, result in improvement in reading comprehension or vocabulary.

2. Teachers reported that the pupils in the experimental group were voluntarily reading more books than ever before and the students stated of many of these books, "This is the best book I ever read."

3. When reporting the difficulty of a book it is wise to include the range of difficulty with emphasis upon the "hardest" samples.

4. There was a significant relationship between average difficulty and the number of unfinished books; likewise, the number of unfinished books among those with the greatest range of difficulty was significantly greater than chance.

5. Books that were specially written for retarded readers ranked highest in interest among the experimental group, adapted classics were second, and informative or textbook type materials ranked lowest.

6. Books with highest average difficulty received low interest ratings much more often than would happen by chance.

7. Interviews with students revealed that even though a book scored above a student's reading level in readability he thought it was "easy" if it was interesting; similarly, a book scoring below a student's reading level in readability was considered "difficult" if it was uninteresting.

NOVOTNY, LORENE. "A Study of the Reading Interests of Slow-Learning Children in the Seventh Grade." Master's thesis, August, 1954.

A group of 128 seventh-grade students from five junior high schools in Kansas City, Kansas, were the subjects of this study. All were two or more years retarded in reading ability and below average in intelligence. A questionnaire on reading habits was designed which contained specific rather than general terms. The words "stories" and "facts" were used instead of "fiction" and "nonfiction." Students also indicated whether each item was a favorite, one that was read frequently, or one that held no interest at all.

In fiction, the boys preferred stories of frontier heroes, wars of our country, the jungle, western adventure and Indians. Girls preferred stories of teenage romance, adventures of girls, funny stories, and pioneer life. Least attractive to boys were modern sea stories, modern travel stories, teenage romance, and adventures of girls. Least attractive to the girls were sea stories of the past, football stories, and stories of jet planes.

In nonfiction, the boys preferred books and magazines about hunting, fishing, how to make things, and airplanes. Girls preferred books and magazines about making friends with other girls, how to act at parties, and "how to fix my room at home." Least attractive to boys were books and magazines about "how to fix my room," how to act at parties, jobs people do, and how to

eat better balanced meals. Least attractive to girls were books and magazines about collecting stamps, about trains, airplanes, and how engines run.

An analysis of materials available for the slow learner revealed the need for books that are mature in format and of a higher interest level than reading level and also that few nonfiction books and magazine articles in the areas of greatest interest for the slow learner have been produced.

RIDGWAY, ROBERT W. "A Study of the Readability, Interest, and Usefulness of Selected Materials for Retarded Readers in Grades Four to Eight." Doctor's thesis, May, 1955.

A group of 113 retarded readers from 56 classrooms, grades 4-8, in six elementary schools in Northeast Kansas were the subjects of this study. The students were divided into three groups: an experimental group who read books from a selected list of materials written especially for retarded readers, a control group A who took no part in the program, and a control group B who read none of the books but were in the same classrooms with children in the experimental group.

Children in the experimental group completed short reports on the books they read indicating their interest in the book and estimate of its difficulty. The *Otis Quick-Scoring Mental Abilities Test: Beta, Form Cm* was used to determine intelligence, and Form T of the two *Metropolitan Reading Tests* was used to determine gains in reading.

Major findings were:

1. The range of difficulty of a book and the difficulty of the hardest sample tested have an important effect upon the actual readability of a book.

2. When interest is high, students tend to read above their measured reading levels.

3. Books of highest average difficulty, hardest sample passages and widest ranges of difficulty were not finished by a number of readers.

4. Interest in a book influences a pupil's estimate of the book's difficulty. Books with high interest scores were judged as "about right" even though rated two or more grades above the measured reading level of the readers by a readability formula.

5. Retarded readers are sensitive to the physical make-up of books. Those that are typical of books for primary children are frequently rejected.

6. The experimental group gained significantly more (.05 level) than the two control groups in reading ability. This may have been the result of increased interest and effort on the part of the teachers, favorable pupil response to extra attention received, plus the opportunity to experience success because of more effective practice with reading materials within their range of ability.

HAM, HARRIET. "An Evaluation of the One-Semester High School Course in Reading in Topeka Senior High School." Master's thesis, May, 1959.

The one-semester high school reading course evaluated in this study is unique in that it was offered to students who were willing to give up a free period each day to improve their reading. Twenty-four sophomores were included in the two classes. The group was limited to those who were having reading difficulty, and included one non-reader, a transfer, and others who were reading at third and fourth grade level.

A diversified reading program was offered in which some instruction was given to the class as a whole, some to small groups, and some to individuals. Students worked individually at their own level in using the *SRA Reading Laboratory*. Study habits, word analysis, getting meaning from context, dictionary use, skimming, and reading newspapers and magazines were included among the class and small group activities. One period each week was spent in the library reading for pleasure and a ten-minute spelling period was scheduled two days each week.

Form III of the *Gates Reading Survey* was given at the beginning of the semester and Form I at the close. The mean gain in speed was 2.04 grades, which was statistically significant at the .001 level. The mean gain in vocabulary was .82 grades, which is possibly significant, statistically, being between the .05 and .02 levels of probability. The mean gain in comprehension was .73 grades which also was between the .05 and .02 levels. All mean gains were socially significant since they exceeded .5 grades which would have been normal for students of average intelligence.

The students' evaluation of the one-semester class was uniformly favorable. That they left the class with a favorable attitude toward reading was indicated by the fact that the boys and the girls each compiled lists of books that they would like to recommend to their friends.

STUDIES OF READING IMPROVEMENT

HAVERTY, THELMA D. "An Experiment on the Use of Vocabulary Drill as a Means for the Improvement of Reading Skill." Master's thesis, June, 1947.

The purpose of this study was stated thus: "to determine whether the reading rate and comprehension of rural high school students might or could be improved by introducing a systematic program of vocabulary study coupled with supplementary reading practice in addition to the regular class work in high school English as required by the Kansas state course of study."

The students in grades 9, 10, and 11 in one small rural high school were used as the experimental group and a comparable group in another small rural high school was used as the control group. Tests used were *Otis Self-Administering Test of Mental Ability, Iowa Silent Reading,* and *Inglis Vocabulary Test.*

The greatest gain of the experimental group over the control group was in vocabulary. The experimental group gained in both speed and comprehension while the control group lost in both. There was an increased interest in reading among pupils in the experimental group as shown by the extent of voluntary reading.

Groups were not equated nor very large, nor were tests of statistical significance computed. The experimental group may have had better teaching, and they did have extra learning opportunities in reading from which they profited.

CORDON, MARJORIE L. "An Experiment in the Teaching of Reading in a Tenth Grade English Class." Master's thesis, July, 1957.

The author states, "The purpose of the experiment was to determine whether five reading lessons a month, given during the regular English class period, would result in better reading ability for a class of 18 sophomores." Form I of the *Gates Reading Survey for Grades 3 to 10* was given at the beginning of the school year and Form II at the end. The mean grade scores of the class were as follows: vocabulary—grade 7.19; comprehension—grade 7.3; speed—grade 7.1; accuracy—grade 7.22.

Two reading lessons each month were taken from *SRA Better Reading,* Books 1, 2 and 3; two periods were given to free library reading; and one lesson each month was devoted to instruction in items like how to study, using the dictionary, using the library, improving newspaper reading, etc.

Gains were recorded in comprehension, speed, and accuracy but none of them were statistically significant at the .01 level. The gain in comprehension was possibly significant, ranking between .02 and .05 in probability.

In volume of reading, the students read nearly three times as many books as they had the year before, increasing from an average of 6 books a year as freshmen to 17 as sophomores. This gain was directly related to the two "free reading" periods scheduled each month in the library.

Since recent intelligence test scores were not available no study was made of how intelligence was related to the students' growth in reading.

HODGES, TERRY M. "An Experiment in Teaching Developmental Reading in the Secondary School." Master's thesis, July, 1958.

The purpose of this experiment was to determine the amount of growth that could be accomplished in 60 lessons of instruction and practice in reading during a single semester. Two classes, one of 34 seniors and the other of 29 freshmen, took the course in the fall semester and two classes of 27 and 22 freshmen respectively completed the course during the spring semester. Form A of the *Diagnostic Reading Tests, Survey Section,* was given at the beginning of the semester and Form B at the end to obtain scores on rate, comprehension, and vocabulary. Intelligence scores from the *Otis Quick-Scoring Mental Ability Test, Gama Test, Form C* were available for the three freshmen classes but not for the seniors.

The program of instruction included working with materials like *How to Improve Your Reading* and *How to Become a Better Reader* by Paul Witty, the *SRA Reading Laboratory,* and the *SRA Better Reading Books,* 1, 2, and 3. In addition, one day each week was given to free reading. A controlled reader was used at intervals to give the students practice in reading rapidly, and numerous lessons were devised by the instructor in teaching phrase reading, skimming, dictionary usage, library training, vocabulary, spelling, and punctuation.

All four groups showed significant gains in both rate and vocabulary at the .001 level. Three of the four groups gained in comprehension and one was possibly significant, ranking between the .05 and .02 level of probability.

The highest level of development was reached in speed, the means for all four groups ranking above the ninetieth percentile at the end of the semester. The group whose gain in comprehension was of possible statistical significance reached the seventieth percentile at the end of the semester. It was this group that had the highest mean I.Q., 109, of all four groups.

NELSON, GWENDEL A. "The Effect of a Reading Improvement Program on the Measured Educational Development of a Group of High School Freshmen." Doctor's thesis, March, 1959.

The subjects of this study were 127 students in the 1956-57 freshman class at Marshall (Missouri) High School who constituted a control group and 154 students in the 1957-58 freshman class who became an experimental group. The purpose of the experiment was to determine what the effects would be of devoting fifty class periods to the use of the *SRA Reading Laboratory* during the spring semester in the usual freshman literature course.

Scores on the *Iowa Tests of Educational Development* were available for both groups at the beginning of the freshman and sophomore years and thus provided a basis for comparison as pre-test and post-test data.

With pre-test scores held constant, the experimental group gained significantly at the .01 level over the control group in the following sections of the *Iowa Tests of Educational Development:* Basic Social Concepts, Correctness of Expression, Quantitative Thinking, Interpretation of Natural Sciences, Interpretation of Literature, General Vocabulary, and the composite score. In background of natural sciences the experimental group gained more than the control group but the gain was not statistically significant. In interpretation of social studies and use of sources of information the control group gained slightly more than the experimental group.

The author states that while the *SRA Reading Laboratory* can be justifiably used to supplement a literature course for high school freshmen, the reading program would need to be supplemented with activities designed to provide more reading materials of a scientific nature, instruction in the use of various sources of information, and additional experience in the kind of critical thinking required in the social studies.

Studies of Reading Factors

DeHaven, Mabel. "A Comparative Study of the Reading Abilities of 34 Deaf Students from the Kansas School for the Deaf at Olathe, Kansas, and 36 Hearing Students from the Central Public School at Olathe, Kansas." Master's thesis, May, 1952.

The purpose of this study was stated in terms of two questions: "Do deaf students recognize the meaning of isolated words and paragraph meaning as well as hearing children, with the grade equivalent held constant?" and "Do male deaf children achieve as much in paragraph meaning and word meaning as do female deaf children with grade equivalent held constant?"

The 34 deaf students were classified as 6a, 6b, and 6c at the School of the Deaf. They ranged in age from 14 to 19 years. The 36 hearing students were a random sample taken from grades 5 and 6 in the Central Public School. The tests given were the *Stanford Achievement Test, Intermediate Battery, Form F,* and the *Durrell-Sullivan Reading Achievement Test, Intermediate Form A.*

The deaf children achieved significantly less than hearing children in word meaning, with the grade equivalent held constant, but there was no statistically significant difference between their achievement in paragraph meaning. There was no statistically significant difference between the

achievement of male and female deaf children in word meaning and paragraph meaning when the grade equivalent was held constant.

JESTER, JAMES F. "An Analysis of the Relationships among Reading, Intelligence, and Scholastic Achievement for a Group of 119 High School Graduates." Master's thesis, September, 1958.

The purpose of this study was to determine the changes that took place in the reading abilities among 119 students from grade 9 to grade 12 and the relation of reading ability to intelligence and to scholastic achievement in subjects that were reading dominated and those that were non-reading dominated. Different forms of the *Iowa Reading Test, New Edition,* were used when these students were tested in grade 9 and four years later in grade 12. The *Henmon-Nelson Test of Mental Ability,* given to these students in grade 9, was used to determine their I.Q.'s. Reading dominated courses included subjects like English, social sciences, science, mathematics, and foreign languages. Non-reading dominated courses were of the performance type like typewriting, physical education, art, and industrial arts.

The mean I.Q. was 105.65 indicating a select group since drop-outs had been excluded from the study. In the 9th grade, the mean reading score of these students was at the 42nd percentile for high school freshmen. In the 12th grade the mean reading score was at the 54th percentile for high school seniors. One hundred eighteen of the 119 students improved in reading ability during the four years of high school instruction: 62 per cent improved more than normal, 8 per cent made normal progress, and 29 per cent improved less than would be normally expected. The gain for the 119 students as a whole was statistically significant at the .001 level. The students who did not make normal progress in reading were found at all intelligence levels, but the greatest percentage were those in the group of 95 I.Q. and below. For the girls, the correlation between reading and intelligence was .71 and for boys .45. The correlation between reading and scholastic average in reading dominated subjects was .50 and between reading and scholastic average in non-reading dominated subjects was .46. The correlation between I.Q. and scholastic average in reading dominated subjects was .54 and between I.Q. and non-reading dominated subjects was .40. None of these differences proved to be statistically significant. The volume of reading done during high school was determined by analyzing the students' records of book reports given. Only one relationship worth noting was discovered between volume of reading and reading ability or intelligence. Students who were more than one standard deviation above the mean in reading ability read about one-third more books than those one standard deviation below the mean in reading

ability. It was obvious that students did not report on all the outside reading done, for minimum requirements had a tendency to dictate maximum performance.

Bibliographical Studies of Reading Materials

Gerakis, Oakie. "An Annotated, Graded Bibliography of Books for High Schools Related to Occupational Interest Areas." Master's thesis, September, 1955.

The purpose of this study was to discover books, both fiction and nonfiction, which contained authentic information about different occupations for high school students. To make it more usable, the list was organized around 11 areas. The first area was labeled "General Vocations" since books which dealt with more than one occupation were listed here. Because many high schools use the *Kuder Preference Record,* the remaining books were placed in the 10 areas into which this test of occupational interest is classified. Thus, a counselor, or high school teacher, who determined certain interest areas by using the *Kuder Preference Record,* would be able to recommend books from this list which the student would be interested in reading.

In addition to a short annotation about each book, the following information is provided: author, title, publisher, address, date, number of pages, cost (in 1955), whether fiction or nonfiction, and approximate grade level of reading difficulty.

A total of 405 books are listed. The areas, number of books, and occupations in which books appear are as follows: *General Vocations*—26. *Outdoor*—75, including animal trainer, explorer, farmer, forester, game warden, hunter, lobster fisherman, lumberman, ranger, sailor, baseball player, basketball player, boxer, coach, football player, golfer, skater, skier, tennis player, trackman, umpire, trapper, and whaler. *Mechanical*—30, including contractor, diver, engineer, fireman, inventor, machinist, mechanic, radioman, railroader, and wireless operator. *Computational*—11, including general mathematics and office workers. *Scientific*—76, including archaeologist, astronomer, aviation worker, bacteriologist, chemist, entomologist, medical doctor, scientist, and veterinarian. *Persuasive*—47, including advertising salesman, bookseller, F.B.I. worker, furniture salesman, judge, lawyer, policeman, mounted policeman, political worker, radio worker, and retailer. *Artistic*—26, including architect, artist, designer, fashion designer, milliner, model, photographer, sculptor, and textile worker. *Literary*—77, including author, journalist, librarian, teacher, actor, and theatre worker. *Musical*—39, including composer, conductor, dancer, pianist, singer, and violinist. *Social Service*—38, including airline hostess, nurse, minister, priest, rabbi, missionary, tearoom hostess,

waitress. *Clerical*—10, including general clerical work, secretary, and stenographer.

ANDERSON, MARGARET H. "An Annotated Bibliography for Developing Vocational Interests in the Secondary School." Master's thesis, May, 1956.

This study attempted to refine the work done by Gerakis (see study reported above) by adding additional titles and deleting others. The facts provided for each book by Gerakis were provided by Anderson with two basic differences. First, Gerakis' annotations were largely taken from sources while those by Anderson were original. Secondly, Anderson classified the books into three levels of difficulty: level 1, 9th grade; level 2, 10th grade; and level 3, 11th and 12th grade. Prices given were 1956 quotations.

A list of 550 books was included. The areas and number of books in each area are listed below. Also listed are occupations in each of the areas which were not included in the list by Gerakis. *General Vocations*—31; *Outdoor*—99; *Mechanical*—37; *Computational*—11; *Scientific*—96, additional occupations including anthropologist and geologist; *Persuasive*—52; *Artistic*—31; *Literary*—92; *Musical*—39; *Social Service*—53, additional occupations including government service, home economist, and occupational therapist; *Clerical*—8.

BIERY, HELEN B. "A Selected Annotated Bibliography of Books in English for Supplementary Reading for Students of First Year Latin." Master's thesis, June, 1957.

Since one of the most commonly stated objectives for studying a foreign language is that of acquainting the student with a culture different from his own, the author set out to discover books in English which would provide supplementary reading opportunities in English for the ninth grade Latin student.

An annotated list of 95 titles was prepared. These titles were classified into three groups: classical mythology, 16 titles; Roman History, Life, and Manners, 39 titles; and Historical Fiction, 40 titles. For each book there is at least a sixty word annotation in addition to author, title, publisher, date of publication, and number of pages. An effort was made to include no books beyond ninth grade reading difficulty. Graded reading lists, teacher observations, the experience of the author, and the Dale-Chall formula were used to determine reading difficulty.

Listed in the appendix, but without annotations, is an additional list including 39 books dealing with Roman history, life, and manners and 40 books of historical fiction.

Available Issues of Kansas Studies in Education

Those issues of *Kansas Studies in Education* which are still in print are listed below. Copies may be secured free of charge by requesting them from the Dean, School of Education, The University of Kansas, Lawrence, Kansas.

Vol. 3, No. 1, *A Summary Report to the North Central High Schools of Kansas on Criterion 2: Pupil Activity Program, Library Service, Guidance Service,* by Kenneth E. Anderson. January, 1952, 24 p.

Vol. 3, No. 3, *A Summary Report to the North Central High Schools of Kansas on Criterion 5: School Plant and Equipment,* by Kenneth E. Anderson, with an addendum: "Acoustical Considerations of School Buildings," by James E. Nickerson. April, 1953, 24 p.

Vol. 4, No. 1, *A Summary Report to the North Central High Schools of Kansas on Criterion 3: School Staff,* by Herbert A. Smith and Kenneth E. Anderson. April, 1954, 24 p.

Vol. 4, No. 2, *Body Measurements of Male Students Entering the University of Kansas,* by Edwin R. Elbel. May, 1954, 24 p.

Vol. 4, No. 3, *A Study of 2500 Kansas High School Graduates,* by Kenneth E. Anderson, Carl E. Ladd, and Herbert A. Smith. June, 1954, 45 p.

Vol. 5, No. 2, *A Summary Report to the North Central High Schools of Kansas on Criterion 4: Administration and Supervision,* by Herbert A. Smith and Kenneth E. Anderson. April, 1955, 62 p.

Vol. 6, No. 1, *Differentiation of the Phenomenal Field,* by A. H. Turney. July, 1955, 22 p.

Vol. 6, No. 2, *Behavioral Potentials and Kinetics,* by A. H. Turney. February, 1956, 28 p.

Vol. 7, No. 1a, *Who Would Be Eliminated? A Study of Selective Admission to College,* with an addendum: "The Class of 1958," by George B. Smith. December, 1956, 28 p.

Vol. 9, No. 1, *Let's Look at the Record! The High School Preparation of 1124 University of Kansas Freshmen,* by George B. Smith. September, 1958, 71 p.

Vol. 9, No. 2, *A Study of Persistence in College Attendance in Relation to Placement-Test Scores and Grade-Point Averages,* by Milo Stucky and Kenneth E. Anderson. April, 1959, 58 p.

Vol. 10, No. 1, *Teaching Reading in the High School in the Language Arts, Social Studies, Science, Mathematics, and Industrial Arts,* by Cloy S. Hobson and Oscar M. Haugh. February, 1960, 46 p.

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